Apple

DUODISK™ Owner's Manual

Customer Satisfaction

If you discover physical defects in the manuals distributed with an Apple product or in the media on which a software product is distributed, Apple will replace the documentation or media at no charge to you during the 90-day period after you purchased the product.

In addition, if Apple releases a corrective update to a software product during the 90-day period after you purchased the software, Apple will replace the applicable diskettes and documentation with the revised version at no charge to you during the six months after the date of purchase.

In some countries the replacement period may be different; check with your authorized Apple dealer. Return any item to be replaced with proof of purchase to Apple or an authorized Apple dealer.

Limitation on Warranties and Liability

Even though Apple has tested the software described in this manual and reviewed its contents, neither Apple nor its software suppliers make any warranty or representation, either express or implied, with respect to this manual or to the software described in this manual, their quality, performance, merchantability, or fitness for any particular purpose. As a result, this software and manual are sold "as is", and you the purchaser are assuming the entire risk as to their quality and performance. In no event will Apple or its software suppliers be liable for direct, indirect, incidental, or consequential damages resulting from any defect in the software or manual, even if they have been advised of the possibility of such damages. In particular, they shall have no liability for any programs or data stored in or used with Apple products, including the costs of recovering or reproducing these programs or data. Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Copyright

This manual and the software (computer programs) described in it are copyrighted by Apple or by Apple's software suppliers, with all rights reserved. Under the copyright laws, this manual or the programs may not be copied, in whole or part, without the written consent of Apple, except in the normal use of the software or to make a backup copy. This exception does not allow copies to be made for others, whether or not sold, but all of the material purchased (with all backup copies) may be sold, given or loaned to another person. Under the law, copying includes translating into another language.

You may use the software on any computer owned by you but extra copies cannot be made for this purpose. For some products, a multi-use license may be purchased to allow the software to be used on more than one computer owned by the purchaser, including a shared-disk system. (Contact your authorized Apple dealer for information on multi-use licenses.)

Product Revisions

Apple cannot guarantee that you will receive notice of a revision to the software described in this manual, even if you have returned a registration card received with the product. You should periodically check with your authorized Apple Dealer.

© 1983 Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, California 95014

Apple and the Apple logo are registered trademarks of Apple Computer, Inc.

Simultaneously published in the U.S.A. and Canada. All rights reserved.

Written by David Marson of the Apple MSD Publications Department.

Warning

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printer, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

Reorder Apple Product #A2L0080

Apple // DuoDisk™ Owner's Manual

Radio and Television Interference

The equipment described in this manual generates and uses radio frequency energy. If it is not installed and used properly, that is in strict accordance with our instructions, it may cause interference to radio and television reception.

This equipment has been tested and complies with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that the interference will not occur in a particular installation, especially if a "rabbit ear" TV antenna is used. (A "rabbit ear" antenna is the telescoping rod type usually contained on TV receivers.)

You can determine whether your computer is causing interference by turning it off. If the interference stops, it was probably caused by the computer or its peripherals. To further isolate the problem:

- Disconnect the peripheral devices and their I/O cables one at a time. If the interference stops, it is caused by either the peripheral or its I/O cable. These devices usually require shielded I/O cables. For Apple peripherals, you can obtain the proper shielded cable from your dealer. For non-Apple peripherals, contact the manufacturer or dealer for assistance.

If your computer does cause interference to radio or television reception, you can try to correct the interference by using one or more of the following measures:

- Turn the TV or radio antenna until the interference stops.
- Move the computer to one side or the other of the TV or radio.
- Move the computer farther away from the TV or radio.
- Plug the computer into an outlet that is on a different circuit from the TV or radio. (That is, make certain the computer and the TV or radio are on circuits controlled by different circuit breakers or fuses.)
- Consider installing a rooftop TV antenna with coaxial cable lead-in between the antenna and TV.

If necessary, you should consult your dealer or an experienced radio/television technician for additional suggestions. You may find helpful the following booklet, prepared by the Federal Communications Commission:

"How to Identify and Resolve Radio-TV Interference Problems"

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock number 004-000-00345-4.

Table of Contents

Preface v

1 **Introduction** 1

Becoming Acquainted 1
Unpacking Your Drive 2

2 **Installation Instructions** 3

Using This Chapter 3
Identifying Your Startup Drive 3
SECTION 1. Installation on Apple IIe 4
Preparing to Install Your Drive 4
Installing the Controller's Internal Cable 5
SECTION 2. Installation on Apple II or Apple II Plus 7
Preparing to Install Your Drive 7
Installing the Controller's Internal Cable 8
SECTION 3. Controller and Interface Cable Installation 10
Installing the DuoDisk Controller 10
Connecting the Interface Cable 11

3 **Preparing to Use Your Drive** 13

How Do I Use My Disk Drive? 13
The Disk 13
Care and Handling of Disks 14
Inserting a Disk into the Drive 15
Removing a Disk From the Drive 18
Write-Protecting a Disk 18
Operating Your Drive 19
Caring for Your Drive 19
HELP! My Drive Doesn't Work! 19

List of Figures

Figure 1-1.	DuoDisk Drive	1
Figure 1-2.	DuoDisk Controller Card	2
Figure 2-1.	Things You'll Need	4
Figure 2-2.	Apple IIe Back Panel	5
Figure 2-3.	Connecting the Controller's Cable to an Apple IIe	6
Figure 2-4.	Things You'll Need	7
Figure 2-5.	Fastening the Cable to Clamp Part B	8
Figure 2-6.	Assembling the Clamp	9
Figure 2-7.	Installed Clamp	9
Figure 2-8.	Installing the Controller Card	10
Figure 2-9.	Connecting the Cable to an Apple IIe	11
Figure 2-10.	Connecting the Cable to an Apple II or Apple II Plus	11
Figure 2-11.	Connecting the Cable to a DuoDisk	12
Figure 3-1.	Diskware	13
Figure 3-2.	Care and Handling of Disks	14
Figure 3-3.	Opening the Disk Insertion Slot	15
Figure 3-4.	Removing a Disk From its Envelope	16
Figure 3-5.	Inserting a Disk into a DuoDisk Drive	17
Figure 3-6.	Closing the Disk Insertion Slot	17
Figure 3-7.	Write-protecting a disk	18

Preface

In this manual you will learn how to unpack and install your DuoDisk drive.

Before attempting to use your drive, read the manuals that come with your computer.

This manual contains three chapters. Chapter 1 introduces you to the drive and explains how to unpack it. Chapter 2 tells how to connect the drive to the Apple II. The final chapter, Chapter 3, provides you with information you need to use your DuoDisk drive. However, to learn how to operate your DuoDisk drive, refer to your computer's operating system manual. Following Chapter 3 you will find an Index.

Throughout this manual, you'll see the symbols explained below. Pay particular attention to the information in the paragraphs identified by these symbols.

Captions, definitions, and other short items appear in marginal notes like this.

Gray boxes contain especially useful or interesting information.

Warning
Warning boxes indicate potential problems or hazardous situations in which you can damage or destroy programs or information.

Introduction

Becoming Acquainted

A flexible disk is commonly referred to as a "floppy" disk.

Your DuoDisk storage system consists of two flexible-disk drives in a light-weight, slim-line cabinet (Figure 1-1), an interface cable and a controller card (Figure 1-2) that you will later install in your computer.

Figure 1-1. DuoDisk Drive

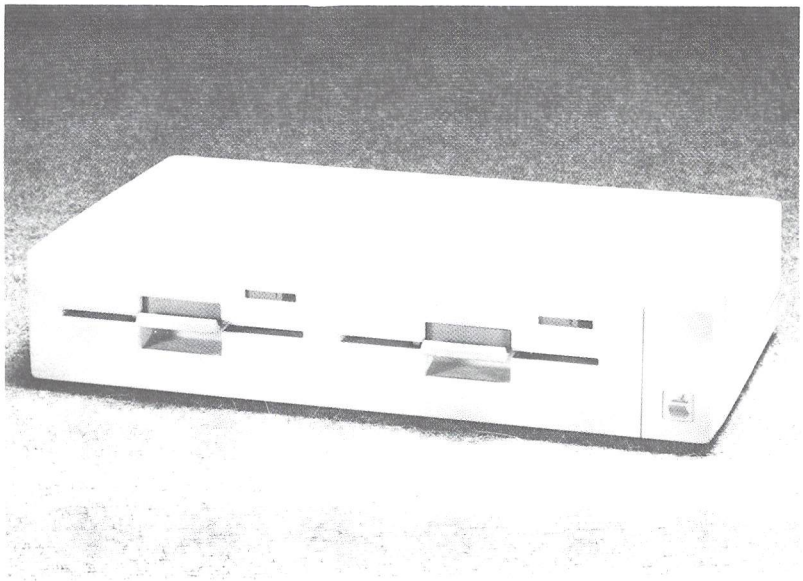
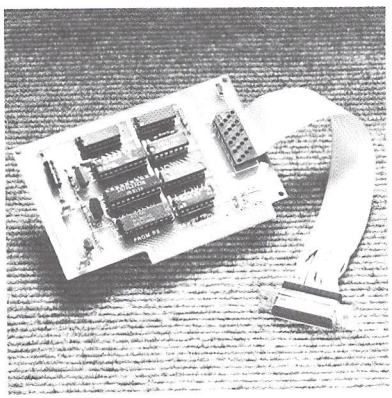


Figure 1-2. DuoDisk Controller Card



Your DuoDisk uses single-sided disks, called Diskware, for storage and retrieval of data.

NOTE: All disks that can be used in the Disk II drive can also be used in your DuoDisk drive.

The disk drive performs three basic functions: it positions its read/write heads to a specified location on the disk, it writes data, and it reads data. However, the drive cannot do any of these things without a controller. The controller interprets commands from the computer and causes the drive to perform its seek, read, and write functions.

Your DuoDisk drive is controlled by an operating system that automatically keeps track of files, saves and retrieves information, and does a multitude of other housekeeping tasks. The few special commands needed to manipulate files and use the drive are described in the reference manual for the particular programming language being used. For a complete understanding of your operating system refer to your operating system manual.

Unpacking Your Drive

Your DuoDisk is a complete mass storage system that comes packed in two cardboard shipping cartons. One contains the DuoDisk drive. The other carton contains the DuoDisk Accessories. The accessories consist of all hardware and cables necessary to connect the DuoDisk to your computer, this manual, and other important documents. As you unpack your system, check your packing lists to make sure you have received all the items listed.

To remove the drive from its shipping carton, first remove the top layer of protective material. Next reach down with both hands, grasp the DuoDisk drive on each side, and carefully pull it straight up and out of the carton. Carefully remove the polyethylene covering and set the drive down gently on its feet.

Installation Instructions

Using This Chapter

This chapter is divided into three sections that will lead you through step-by-step instructions for installing your DuoDisk drive on an Apple II computer.

Follow the instructions in Section 1 if your computer is an Apple IIe. However, if your computer is an Apple II or Apple II Plus, follow the instructions in Section 2. When you complete the applicable installation section, you will be directed to Section 3 for instructions on installing the DuoDisk controller card.

Warning
Electrical equipment can be hazardous if misused. Operation of this or similar products must always be supervised by an adult. The installation of products, including peripheral and interface devices must be performed by an adult. Do not allow children access to the interior of any electrical product or to handle power or I/O cables.

Identifying Your Startup Drive

boot A jargon term for startup. It means to start up a computer or to load a program into a computer's memory and execute it to get the system running.

expansion slot A connector inside the computer in which a peripheral card can be installed; sometimes called slot or peripheral slot.

The "startup" or "**boot**" drive is the drive that your computer uses to load the Disk Operating System into memory when the computer is turned on or restarted. Your computer has a built-in program that checks its **expansion slots** for a disk drive controller card. This program starts by checking slot 7 and then works its way through the remaining slots in descending order until it finds a disk controller. The disk drive connected to this controller as drive 1 then becomes the startup drive.

If you have a disk drive controller card already installed in a high numbered slot and want your DuoDisk as your startup drive, you could move that controller to a lower numbered slot and install your DuoDisk controller into the higher numbered slot. If you do, remember to use the appropriate instructions to reinstall your existing controller. Otherwise, install your DuoDisk controller in a lower numbered slot such as slot 4. The installation instructions are written assuming you will install the controller in slot 6. If you choose a different slot, be sure to keep this in mind when following the installation instructions.

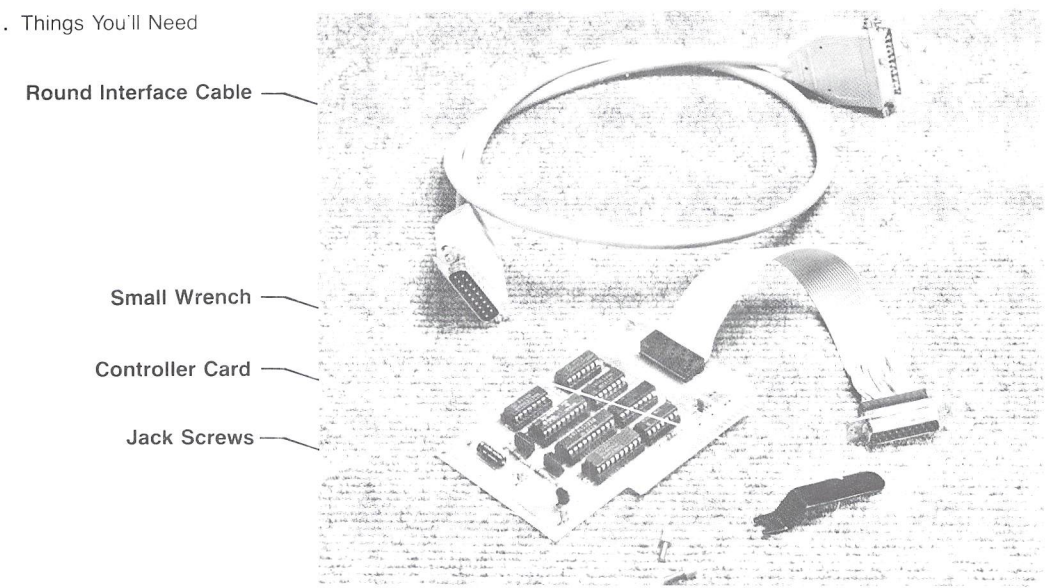
SECTION I
Installation on Apple IIe

Preparing to Install Your Drive

In addition to your drive and the Apple IIe, you'll need the items listed below and shown in Figure 2-1.

- Round interface cable
- Your disk controller card, with attached ribbon-like cable
- Two jack screws
- A small wrench
- A small flat-blade screwdriver (not supplied)

Figure 2-1. Things You'll Need



Installing the Controller's Internal Cable

1. Turn off the power switch on the back of your computer and any other attached peripheral devices.

Warning

If you try to connect anything to or disconnect anything from the inside of your computer when the power is on, you are likely to damage the circuits and lose any information stored in random access memory (RAM).

2. Reach behind the computer and pull up on the back corners of the cover until the corner fasteners pop apart. Carefully remove the cover and set it aside.
3. Look down into your computer and locate the power supply —the rectangular metal box along the left side of the computer. Touch the power supply case with one hand to discharge any static charge that may be on your clothes or body.

By the Way: As you are looking into your computer notice that the openings in the back panel are filled with cover plates.

4. Remove the cover plate from opening 2 on the back panel of your computer (see Figure 2-2).

Here's How: Remove the cover plates by reaching inside the computer and pushing down and out on the plastic tab on the top of each cover plate.

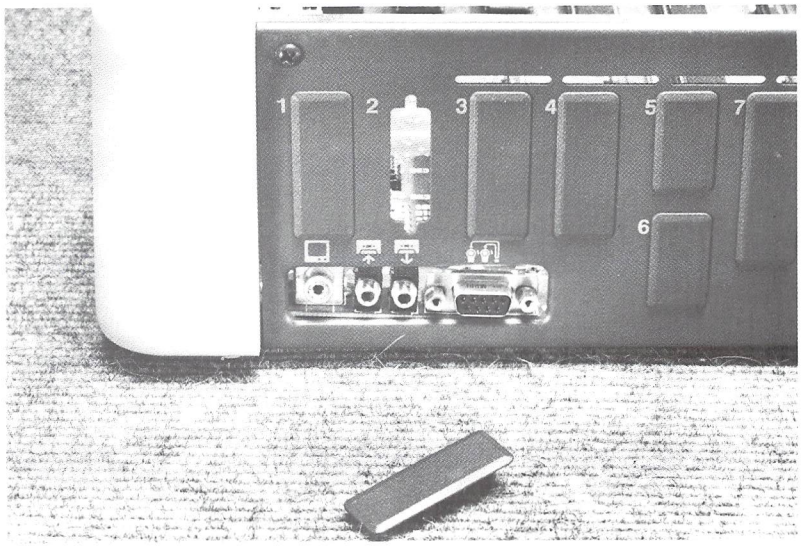


Figure 2-2. Apple IIe Back Panel

5. Arrange the controller card with its ribbon-like cable as shown in Figure 2-3.

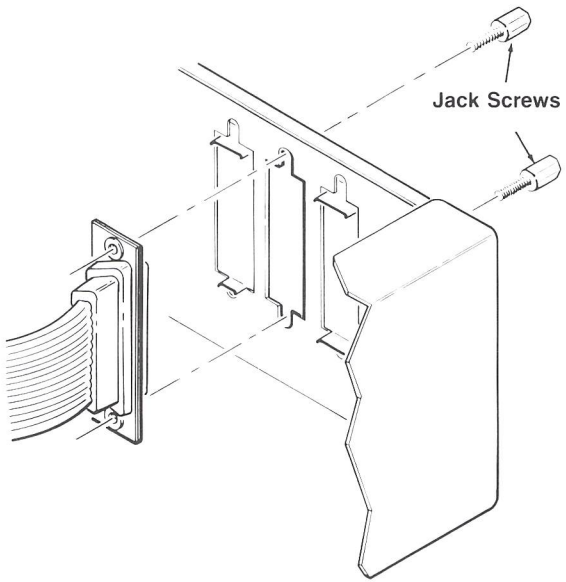


Figure 2-3. Connecting the Controller's Cable to an Apple IIe.

6. Hold the D-shaped connector against the opening. Reach behind the computer and install the two jack screws into the threaded holes. Then use your small wrench to tighten the screws.

Note for Two DuoDisk Drives: If you are installing a second DuoDisk drive, remove the cover plate from opening 4. Then repeat steps 5 and 6.

Continue with the installation of your DuoDisk drive by installing the controller card in slot 6 as explained in Section 3.

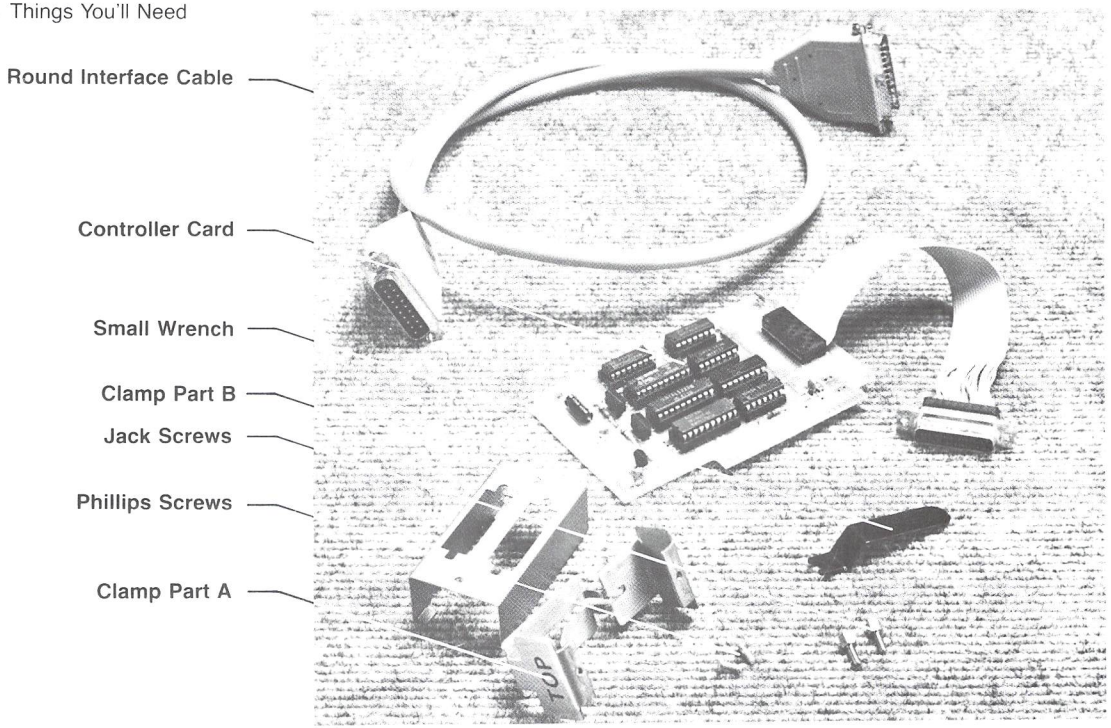
SECTION 2
Installation on Apple II or Apple II Plus

Preparing to Install Your Drive

In addition to your drive and the Apple II or Apple II Plus, you'll need the items listed below and shown in Figure 2-4.

- Round interface cable
- Your disk controller card, with attached ribbon-like cable
- Two-part retaining clamp, two jack screws and two Phillips screws (not included, available as service part 655-8112)
- A small wrench
- A small flat-blade screwdriver (not supplied)
- A small Phillips screwdriver (not supplied)

Figure 2-4. Things You'll Need



Installing the Controller's Internal Cable

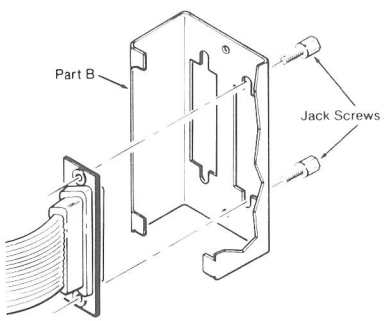
- Turn off the power switch on the back of your computer and any other attached peripheral devices.

Warning

If you try to connect anything to or disconnect anything from the inside of your computer when the power is on, you are likely to damage the circuits and lose any information stored in random access memory (RAM).

2. Reach behind the computer and pull up on the back corners of the cover until the corner fasteners pop apart. Carefully remove the cover and set it aside.
3. Look down into your computer and locate the power supply—the rectangular metal box along the left side of the computer. Touch the power supply case with one hand to discharge any static charge that may be on your clothes or body.
4. Using the two jack screws and a small wrench, fasten the controller card's ribbon-like cable to either opening in retaining clamp part B as shown in Figure 2-5.

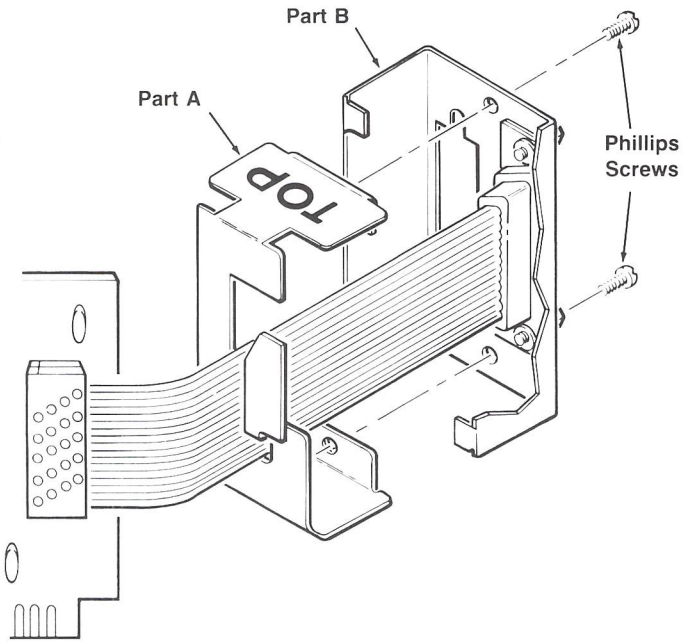
Figure 2-5. Fastening the Cable to Clamp Part B



Note for Two DuoDisk Drives: If you are installing a second DuoDisk drive, fasten your second controller card's ribbon-like cable to other opening in retaining clamp part B.

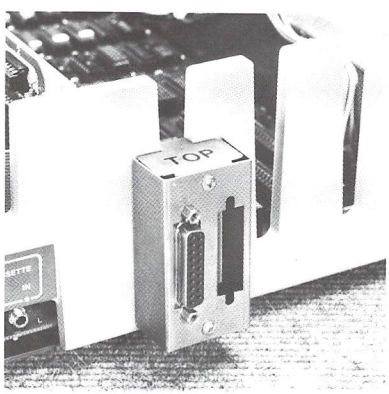
5. Slide the two parts of the retaining clamp together making sure that the word TOP on part A is facing up (see Figure 2-6).

Figure 2-6. Assembling the Clamp



6. Feed the Phillips screws into the clamp's aligned screw holes. Give the screws a few turns, but don't tighten them yet.
7. Locate the three deep vertical notches on the rear of the computer's case. Slide the clamp assembly as far down as possible into one of the vertical notches. Make sure that the label TOP is facing up as shown in Figure 2-7.
8. Now, tighten the two Phillips screws on the retaining clamp assembly until it is secured to the back of your computer.

Figure 2-7. Installed Clamp



Continue with the installation of your disk drive by installing the controller card as explained in Section 3.

SECTION 3
Controller and Interface Cable Installation

Installing the DuoDisk Controller

peripheral card A printed circuit board that can be added to your computer and allows it to communicate with an attached device (peripheral) such as a disk drive.

1. Locate the **peripheral card** connectors (usually referred to as slots) across the rear of your computer's main circuit board. Each slot is identified by a number on the circuit board. Slot 6, the second slot from the right, is normally used for your first disk drive controller card.

Warning

In the following steps you will handle the DuoDisk controller card. Handle it with care. Grasp it by the corners or edges, and try not to touch the components. Above all, don't grasp the card by the gold "fingers" on its bottom edge—they are the medium through which the computer communicates to the card and their efficiency decreases if they are dirty or scratched.

2. Gently but firmly push the gold "fingers" on the card's edge connector into slot 6, rear edge first as shown in Figure 2-8. Then push the front edge down and gently rock the card back and forth until it is level and firmly seated.

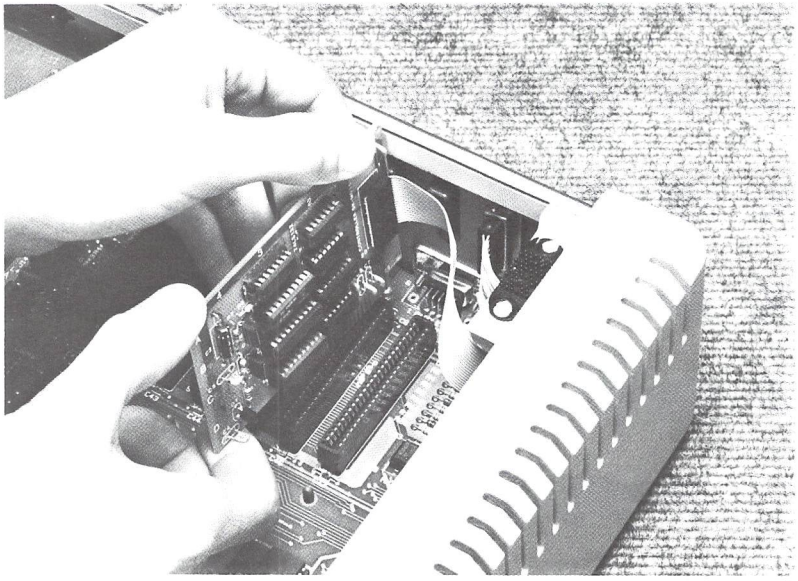


Figure 2-8. Installing the Controller Card

Note for Two DuoDisk Drives: If you are intending to install a second DuoDisk, you will need to install a second controller card. Locate slot 4, the fourth slot from the right. You'll use slot 4 for your second controller card, leaving slot 5 empty. Slide your second controller card into slot 4. Press down on the card to ensure that it's firmly seated in the slot.

3. Slide the computer's top cover into place and press down on the rear corner fasteners until they pop into place.

Connecting the Interface Cable

The interface cable connects your DuoDisk drive to the controller card that you installed in the computer. It is a round, shielded cable with a 19-pin, D-shaped connectors on one end and a 25-pin, D-shaped connector on the other.

Note: This product was FCC certificated using a shielded interface cable. To prevent electromagnetic interference it is important that you use the shielded cable provided.

To connect your interface cable:

1. Turn the computer around until the back is facing you.
2. Plug the 19-pin D-shaped connector on the end of your interface cable into the D-shaped connector that you just installed on the back of your computer (see Figure 2-9 or Figure 2-10).

Figure 2-9. Connecting the Cable to an Apple IIe

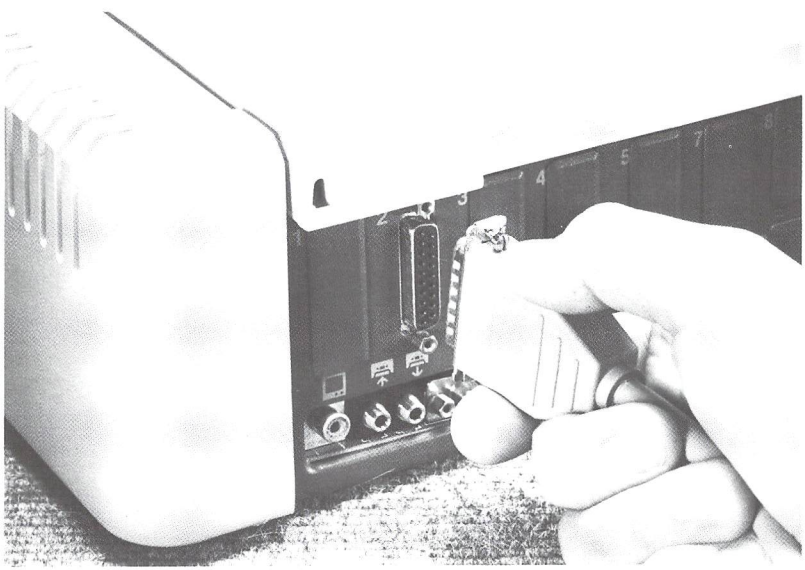
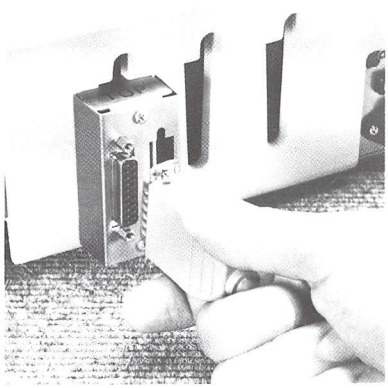


Figure 2-10. Connecting the Cable to an Apple II or Apple II Plus



3. Connect the other end of your interface cable to your DuoDisk. Connect it to the D-shaped connector on the back of the drive as shown in Figure 2-11.

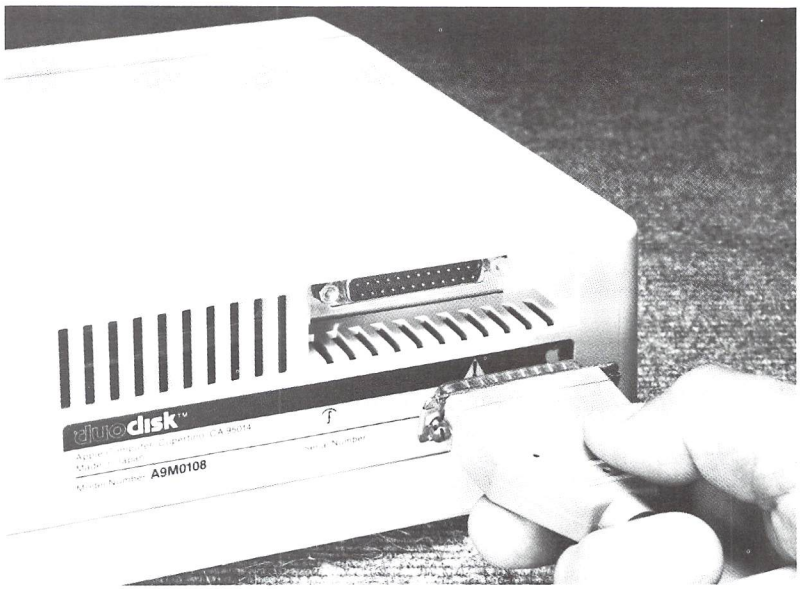


Figure 2-11. Connecting the Cable to a DuoDisk

4. Tighten the retaining screws on the interface cable connectors and apply the ID labels to your DuoDisk drive. Attach drive ID label 1 to the recess near the left disk insertion slot and drive ID label 2 to the recess near the right disk insertion slot.

If you're satisfied that you have correctly connected the DuoDisk drive to your computer, you're ready to go to Chapter 3 to learn how to use your disk storage system.

Preparing to Use Your Drive

How Do I Use My Disk Drive?

You must first learn how to handle and care for your Diskware. You will also need to know how to insert the disk properly into the drive. Following that, you will need a basic understanding of your operating system. Both care and handling of disks and disk insertion are explained in this chapter. For an understanding of the operating system read your operating system manual and practice the commands.

The Disk

The Diskware disk is a 5.25 inch circular piece of plastic contained in a rectangular jacket (see Figure 3-1). This jacket protects the disk, and contains both cleaning agents and lubricants which keep the disk clean and allow it to spin freely.

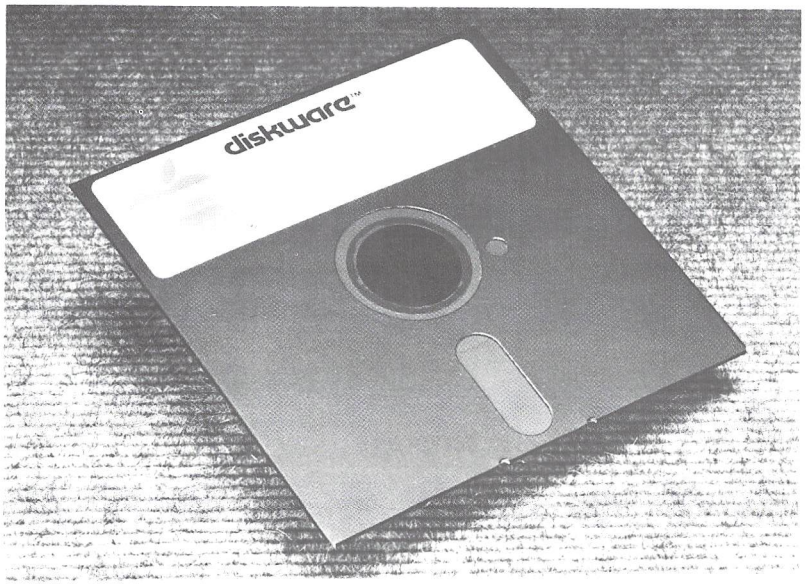


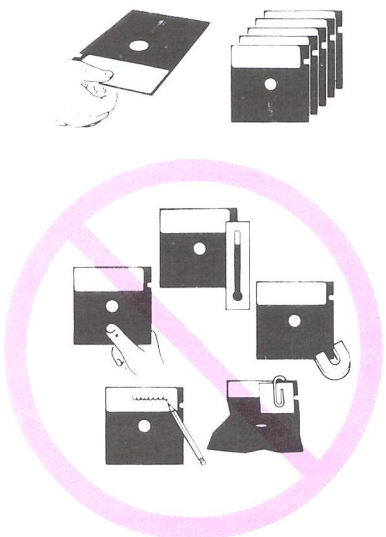
Figure 3-1. Diskware

The disk is coated with a material similar to the magnetic coating on recording tape. This allows information to be recorded on, or retrieved from, the surface of the disk.

Care and Handling of Disks

The disk is somewhat flexible; that is why it is sometimes referred to as a "floppy" disk. However, it should be handled carefully, as actual bending can damage it. The following general rules should be followed when handling disks (see Figure 3-2).

Figure 3-2. Care and Handling of Disks



Never let anything touch the brown or gray surface of the disk itself. Handle the disk by the black plastic jacket only. When a disk is not in use, keep it in its paper envelope. The envelopes are treated to minimize static build-up which attracts dust. It is best to store disks vertically when they are not in use. Vinyl notebooks made especially for this purpose are convenient.

A single Diskware disk holds 143,360 (formatted) bytes of information. Since an individual bit of information occupies a very small portion of the disk, an invisible scratch on the surface of the disk, or even a fingerprint, can cause errors. Do not place disks on dirty or greasy surfaces; do not let them collect dust.

Handle the disk by its jacket and label. Never touch the disk itself.

To write on a label already attached to a disk, use a FELT TIP pen. Do not press hard. It is better to write the label before you attach it to the disk.

Do not write on an attached label with a pencil or ball point pen; this may put dents in the recording surface. Also, do not use an eraser on the label. Eraser dust is abrasive and can damage the disk.

Do not bend disks or attach paper clips to them.

Store disks upright in their envelopes and away from direct sunlight, moisture, or extremes of heat and cold. On hot days, car trunks (or dashboards, glove compartments, or any other enclosed areas) can be a disk's worst enemy.

Keep disks away from magnets or electrical devices, especially telephones, television sets, and large motors. It is OK to lay them temporarily on the computer or disk drive.

With reasonable care, a disk will give you an average life of about 150 hours—which is a lot when you consider the few seconds it takes to load a file from a disk. But with just a little bit of carelessness, a disk may give you no service at all.

Inserting a Disk into the Drive

1. Open the disk insertion slot by pushing in on its latch as shown in Figure 3-3. If there is a disk in the slot, carefully remove it and put it in an envelope.

Warning

Be extremely careful not to touch the areas of the disk exposed by the oval cut-outs in the jacket.

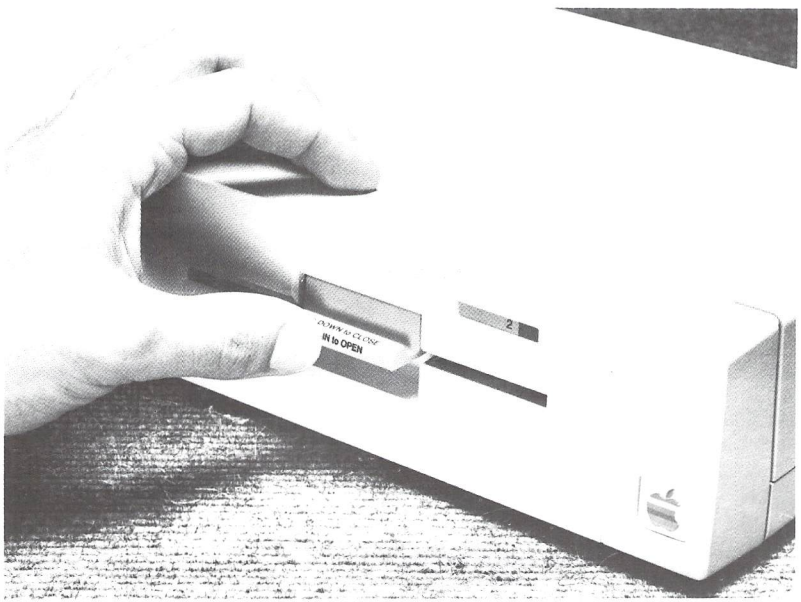


Figure 3-3. Opening the Disk Insertion Slot

2. Locate the disk you want to use. Hold it with your thumb on the label and remove it from its envelope as shown in Figure 3-4.

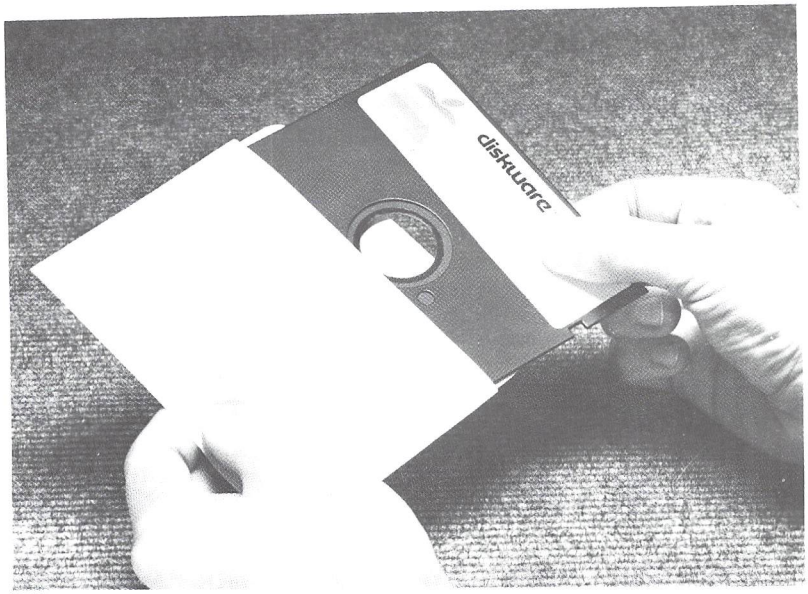
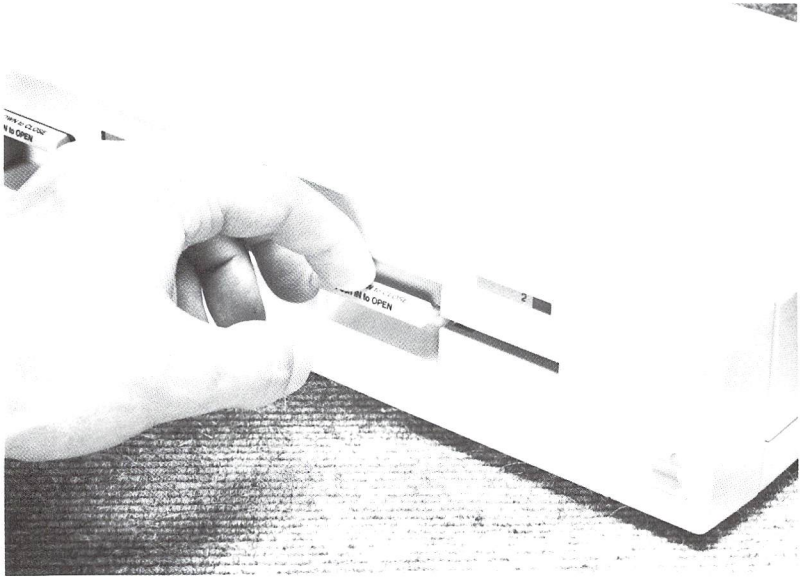


Figure 3-4. Removing a Disk From its Envelope

3. Gently insert the disk into the slot of the disk drive, oval cut-out end first, label side up (see Figure 3-5). Be careful not to bend or force the disk. If you feel any unusual resistance, pull the disk back out slowly and try again.
4. When the disk is all the way inside, push down on the latch as shown in Figure 3-6 until it clicks shut.

Figure 3-5. Inserting a Disk into a DuoDisk Drive

Figure 3-6. Closing the Disk Insertion Slot



Removing a Disk From the Drive

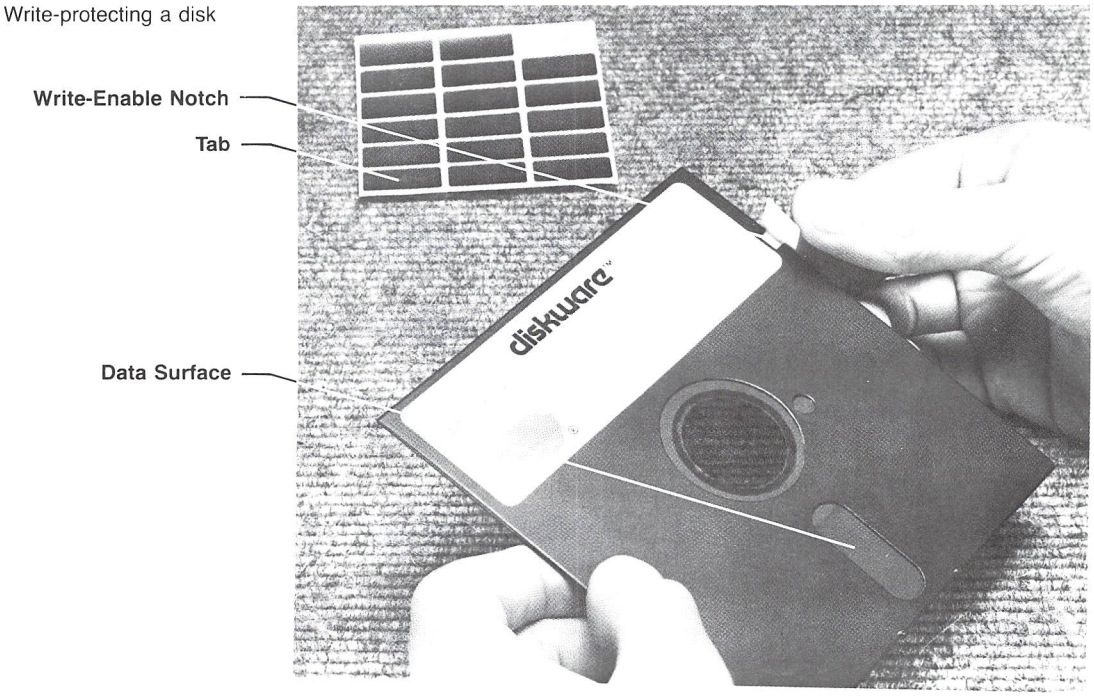
1. Make sure the in use light is off. Never remove a disk while this light is on: doing so may damage the disk, or at least destroy some of the information on it.
2. Open the disk insertion slot by pushing in on the latch (see Figure 3-3).
3. Gently remove the disk from the slot and put it in an envelope.

Note: The act of opening the disk insertion slot lifts the head loading arm off the disk. If you plan to leave a disk unused in a drive for several hours, it's a good idea to open the door so the head won't rest on the disk.

Write-Protecting a Disk

Each Diskware disk has a rectangular, write-enable notch cut out on its back, left corner (when viewed from the insertion position). The purpose of this notch is to allow you to store information on a disk during a write operation. To write-protect your disk, simply stick one of the small tape tabs supplied with your disks over the notch as shown in Figure 3-7.

Figure 3-7. Write-protecting a disk



With the notch covered, the computer cannot write any information onto the disk surface, or change information which is already there. If, at a later time, you desire to store information on the disk, you must first remove the write-protect tab.

Warning
The write-protect feature will not protect a disk from accidental loss of data due to careless handling.

Operating Your Drive

The disk drive contains absolutely no operating controls. It runs on DC power which is supplied by the computer whenever it is turned on. All drive functions are controlled by your computer. The red indicator lights on the front panel come on whenever the drive is in use. Programs that keep track of files, save information, and retrieve information are part of your operating system. The few special commands required to use the drive and manipulate files are described in the reference manual for the product or programming language you are using.

Caring for Your Drive

Your disk drive, unlike the computer, is a mechanical device, with motors and moving parts. Therefore, it is somewhat more delicate than the computer. The disk drive was completely aligned and tested at the factory, and with proper care and handling should provide trouble free operation. However, rough handling, such as dropping the drive, sharply jarring it, or allowing heavy objects to fall on it, can cause a malfunction.

HELP! My Drive Doesn't Work!

If your disk drive does not operate, reread this manual carefully to make sure that everything is correctly installed and the cables are properly connected—this cures most problems. (Check that the controller card is in the appropriate slot in your computer.)

This isn't likely, but if your drive received excessive rough handling during shipping, one of the connectors inside of the cabinet may be loose. If this condition is suspected, contact your dealer.

Do not attempt to enter the disk drive cabinet as this could void your warranty.

Index

A

Apple II and Apple II Plus, DuoDisk for 3, 7-12
Apple IIe, DuoDisk for 3, 4-6, 10-12

B

boot 3
boot drive 3-4

C

care and handling of disks 14-15
caring for the drive 19
connecting the interface cable to your Apple II 11
connecting the interface cable to your drive 12
controller card 1-2, 10
controller's internal cable 5-6, 8-9

D

description, DuoDisk 1-2
disk construction 13-14
Diskware 1, 3, 18
drive problems 19

E

edge connector 10
expansion slots 3-4, 10-11

F

floppy disk 1, 14 (see Diskware)

G & H

I

identifying your boot (startup) drive 3-4
indicator, front panel 18, 19
inserting and removing a disk 15-18
installation on Apple II or Apple II Plus 7-12
installation on Apple IIe 4-6, 10-12
installing the DuoDisk controller 10-11
interface cable 11-12

J, K, L & M

O

operating DuoDisk 19

P

peripheral card 1-2, 3-4, 10
powering up the drive 19

Q

R

read operation 2
removing Apple II's cover 5, 8

S

second DuoDisk drive 6, 8, 11
slots 3-4, 10-11
startup drive 3
storage capacity 14

T

television/radio interference i

U

unpacking your drive 2
using the drive 13-19

V

W

write operation 2
write-protecting 18-19

X, Y & Z

20525 Mariani Avenue
Cupertino, California 95014
(408) 996-1010
TLX 171-576

030-0715-A